SciBar DAQ

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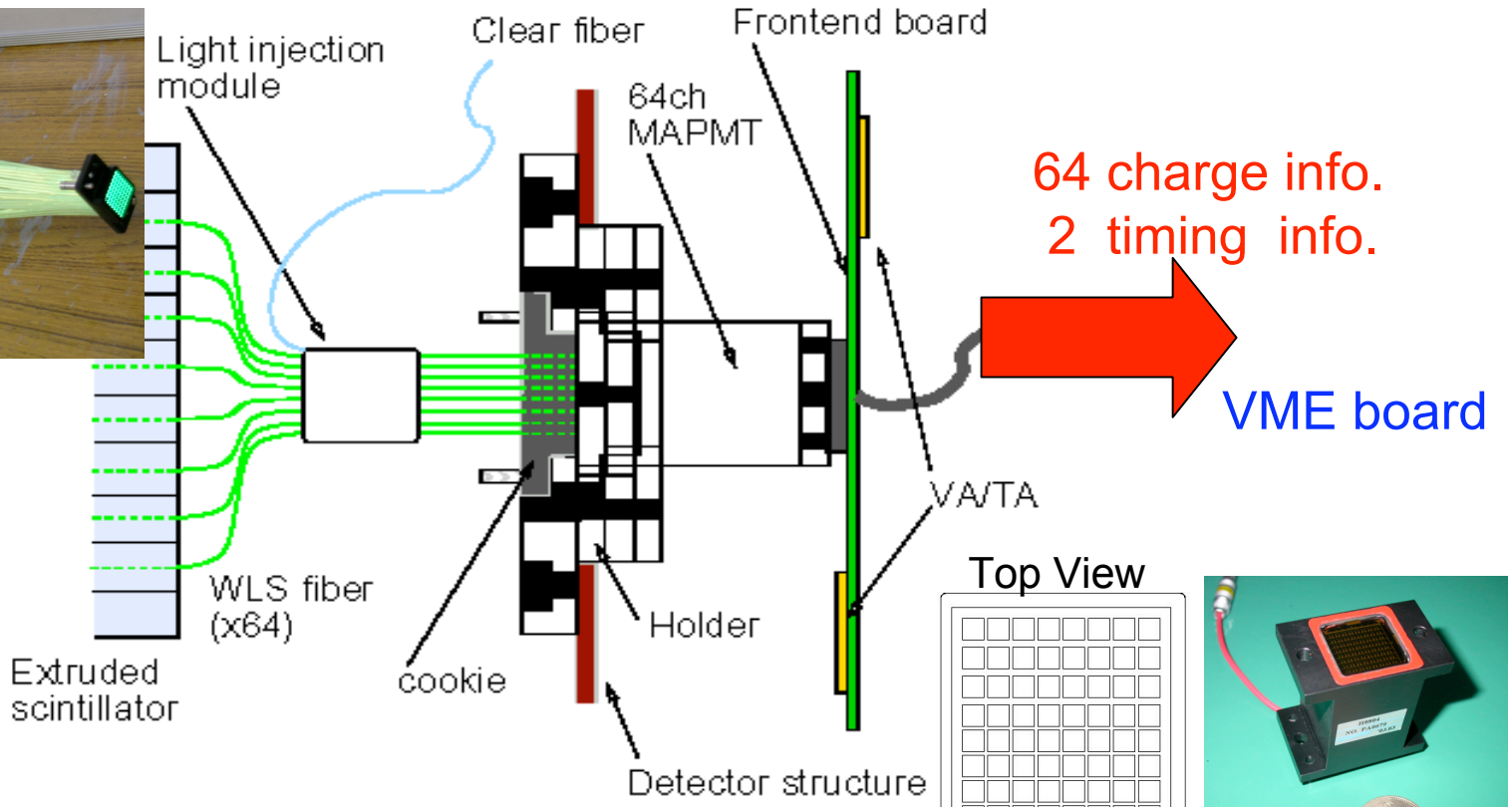
SciBar components



Extruded Scintillator (1.3×2.5×300cm^3)
- made by FNAL (same as MINOS)

Wave length shifting fiber (1.5mmΦ)
- Long attenuation length (~350cm)

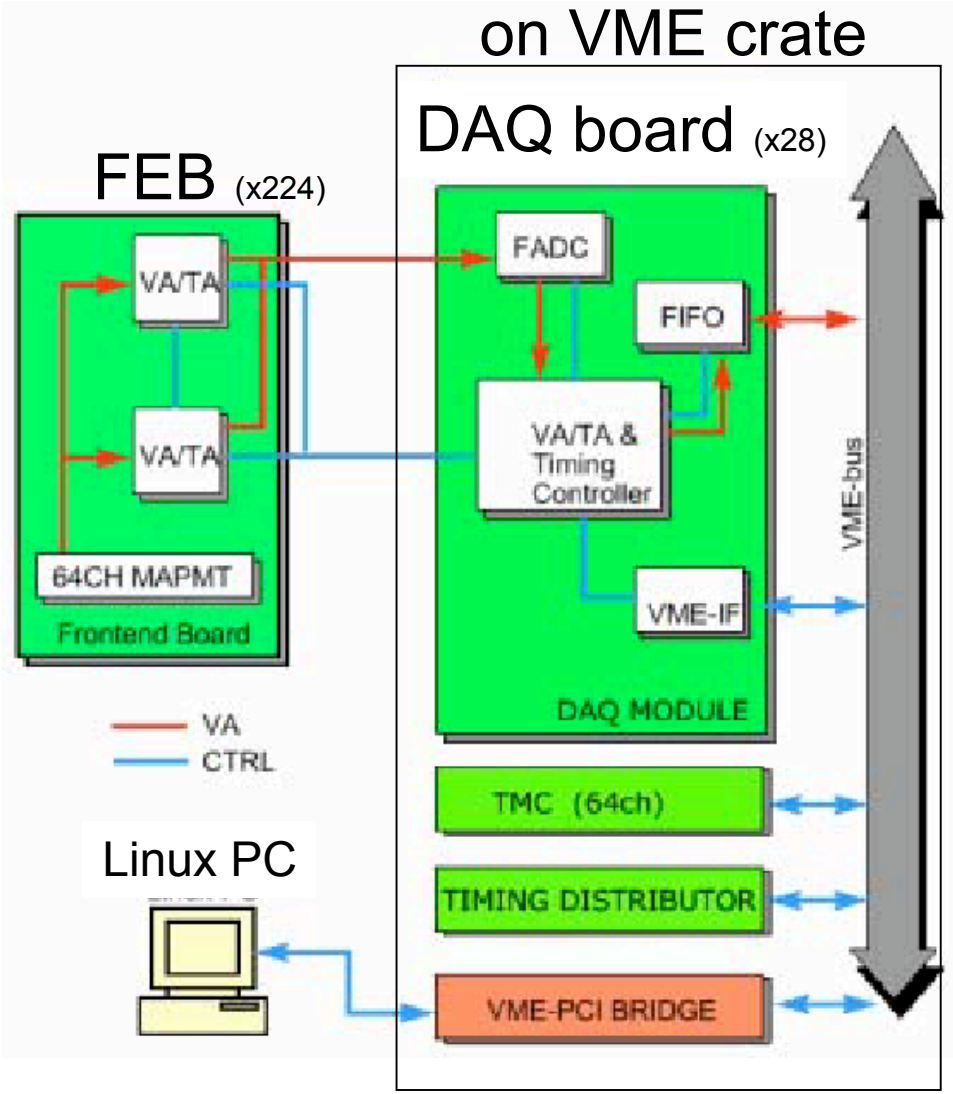
→ Light Yield : 18.9p.e./cm/MIP

Multi-Anode PMT
- 2×2mm^2 pixel (3% cross talk @1.5mmΦ)
- Gain Uniformity (20% RMS)
- Good linearity (~200p.e. @6×10^5)

Readout electronics with VA/TA
- ADC for all 14,400 channels
- TDC for 450 sets (32 channels-OR)

SciBar DAQ electronics

- Front-end board (FEB)
  - Serialize analog output from MA-PMT (64ch->1ch)
- Controller (VME basis)
  - DAQ board (9U)
    - Readout 8 FEBs
    - Digitization
- Trigger/timing system
- HV/LV controller



Data Acquisition

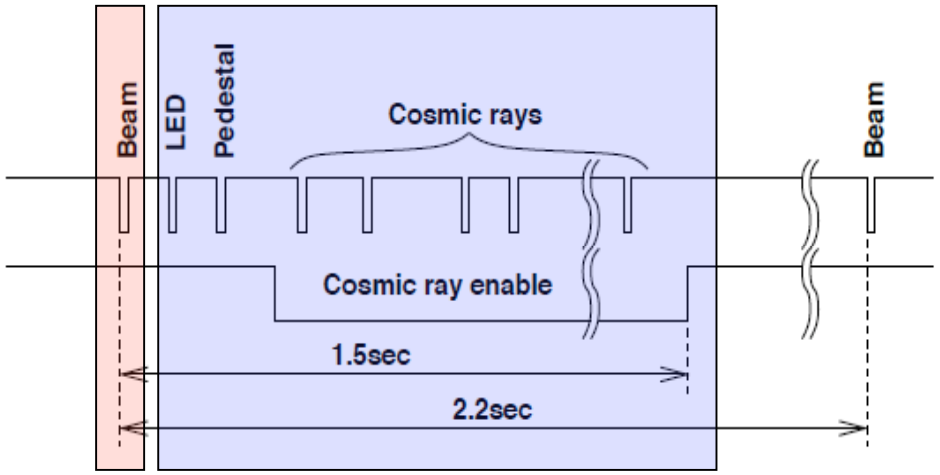
- In one spill (2 sec), we collect the following data;
  - Beam
    - Trigger with beam timing (kicker signal of p-beam?)
    - Record all data of 10 batches (up to 15 Hz), even if there is no ν-interaction.
  - Pedestal
    - 1 event/spill
  - LED
    - 1 event/spill
  - Cosmic ray
    - Self trigger (hit pattern)
    - ~5 triggers/spill will be recorded.

Data for calibration

DAQ timing diagram

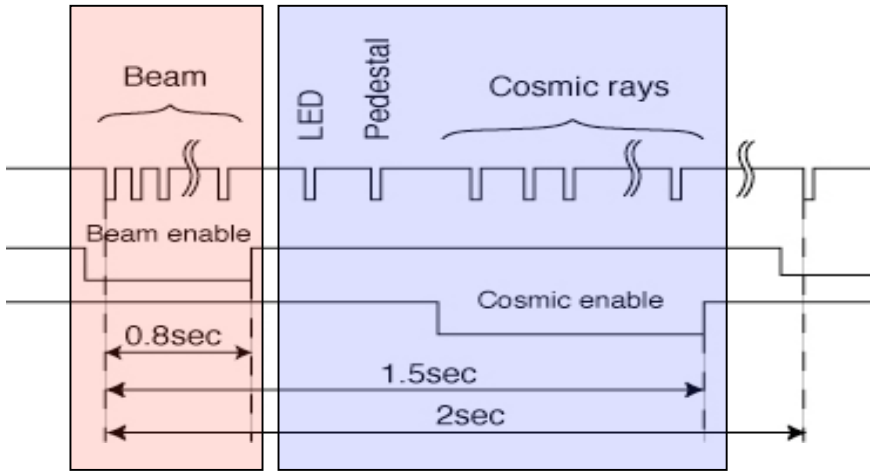
~comparison with K2K~

K2K with KEK-12GeV PS



In one spill (2.2sec):
ν-Beam: 1 pulse/spill

SciBooNE with FNAL BNB



In one spill (2 sec):
ν-Beam: up to 10 pulses/spill
(15Hz)

- Difference is the ν-beam frequency
  - ➔ DAQ upgrade is needed.
  - ➔ The upgrade is in progress
    by Kurimoto, Yokoyama in Kyoto Univ.

SciBooNE-SciBar DAQ timing

ν-beam spill to spill time: 2 sec

- ν-beam: 0.8 sec
  - Up to 10 batches/spill (15Hz)
- Calibration data: 0.7 sec (after ν-beam)
  - LED
  - Pedestal
  - Cosmic ray

1.5 sec

- Rest 0.5 sec: ready for the next ν-beam

Summary

- All readout electronics used in K2K can be reused.
- DAQ timing in one spill is almost the same as in K2K.
  ➔ DAQ software can be reused.
- To suite BNB frequency (15Hz), an upgrade in DAQ is needed;
  ➔ Upgrade is in progress (by Kurimoto, Yokoyama)